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| **Ideal Gases** | Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

1. One mole of oxygen gas is at a pressure of 6.00 atm and a temperature of 27.0°C.
   1. If the gas is heated as constant volume until the pressure triples, what is the final temperature?
   2. If the gas is heated until both the pressure and volume are doubled, what is the final temperature?
2. An ideal gas occupies a volume of 1.00 cm3 at 20°C and atmospheric pressure (1.013 x 105 Pa).
   1. Determine the number of molecules in the container.
   2. If the pressure of the 1.00 cm3 volume is reduced to 1.00 x 10-11 Pa (an extremely good vacuum) while the temperature remains constant, how many moles of gas remain in the container?
3. Gas is confined in a tank at a pressure of 10.0 am and a temperature of 15.0o C. If half the gas is withdrawn and the temperature raised to 65o C, what is the new pressure in the tank?
4. A cylinder contains a mixture of helium and argon gas in equilibrium at a temperature of 150o C.
   1. What is the average kinetic energy of each type of molecule?
   2. What is the vrm of each type of molecule?
5. If 2.0 mol of as gas are confined to a 5.0 L vessel at a pressure of 8.0 atm, what is the average kinetic energy of the gas molecules?

**Answer:**

1. a. 627o C b. 927o C
2. a. 2.51 x 1019 molecules b. 4.11 x 10-21 mols
3. 5.87 atm
4. a. 8.76x 10-21 J b. vrms Ar 518 m/s, vrms He 1624 m/s
5. 5.04 x 10-21 J